

# Chapter 2

## Poverty Alleviation with Microfinance: Bangladesh Evidence

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**Abstract** This study provides evidence of the impact of membership of a microfinance institution (MFI) in Bangladesh on poverty alleviation. Using a quasi-experimental approach with a control group the members of which had never been members of a MFI, interviews with members of a prominent Bangladesh MFI were conducted in relation to their material possessions. In almost every aspect of material well-being, including income, ownership of assets, savings and food intake, members of the MFI are significantly better off than non-members when examined on a univariate basis. In multivariate tests, MFI membership is found to be associated with household income and, further, household wealth, measured in terms of savings, is associated with longer membership of a MFI.

**Keywords** Microfinance • Poverty alleviation • Economic development • Empowerment of women • Bangladesh • Well-being

### 2.1 Introduction

Poverty is a key issue in the development arena that has received significant attention from various agencies due to its relevance to human welfare and progress. The purpose of this study is to investigate the impact of membership of a microfinance program on poverty in Bangladesh at the household level. The study

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provides evidence of the impact of microfinance institution (MFI) membership in terms of material outcomes and examines the influence of longer versus shorter MFI membership on these outcomes.

## 2.2 Poverty

Poverty in its most basic form can be defined as a deprivation of well-being and this has been the concern of policy makers and, more recently, of many non-governmental organizations (NGOs). Yet, poverty is not a problem that has eased with time. According to the United Nations Human Development Report, approximately 1.2 billion people *worldwide* earned only US\$ 1 a day in 2000; 2.4 billion were without basic sanitation; 1 billion were illiterate; 100 million were homeless; and approximately 100 million children lived or worked on the streets (UNDP 2000, p. 19; Globalissues.org 2009).

The ramifications of poverty extend far beyond just the problems associated with a lack of income. Individuals living in poverty ‘are particularly vulnerable to adverse events outside their control’ (Smith 1776); they often lack social rights and are excluded from society. Despite the long-standing presence of poverty throughout the world, it was not until the 1970s that issues associated with poverty came to the forefront of debate and policy formulation in the area of development economics (Fukuda-Parr and Kumar 2003).

In broad terms, poverty can be said to result from distributional issues including unemployment, lack of income, lack of fulfillment of basic needs, landlessness, and unavailability of credit. It can be seen as the lack of means for the necessary expenditure enabling purchase of a minimum standard of living, for example, nutrition. This minimum standard varies from country to country. This notion reinforces the dynamic aspect of poverty as the ‘poverty line’ shifts with changes in the overall condition of the economy (Runciman 1962; Townsend 1985). Thus, poverty is multidimensional. Moreover, poverty restricts one’s ability to participate in society.

The notion of deprivation is broader than the concept of poverty and is intrinsically multidimensional (Smith 1776; World Bank 2000). Deprivation has many forms, but what is common to all these forms is that deprivation restricts what Amartya Sen calls ‘the capabilities that a person has, that is, the substantive freedom he or she enjoys to lead the kind of life he or she values’ (Sen 1999, p. 87). This capability perspective further explains the notion of deprivation which Smith (1776) depicts as the inability ‘to appear in public without shame’ and which is directly related to the concept of social exclusion.

This paper presents evidence on the impact of membership of an MFI on material outcomes. The study uses interview evidence gathered from 198 Bangladesh microfinance members, together with evidence from 97 control group members who had never joined an MFI program, to test whether membership enables alleviation from poverty. Using both univariate tests of comparison between MFI and

control group members and multivariate regression, evidence is found of higher income assets, savings, food intake, housing security and quality, and more income sources in the case of MFI members. Further, MFI members report better housing conditions as compared to non-members. Additionally, before and after MFI membership comparisons reveal significant improvement in material outcomes associated with becoming an MFI member. However, no evidence is found that longer duration of MFI membership is significantly associated with improved material outcomes apart from savings.

## 2.3 Microfinance's Role in Addressing Poverty

In recent years, numerous studies have noted the positive impact of microfinance on clients with regard to material well-being, reduction in exposure to seasonal vulnerability, contributions to consumption smoothing, and a better ability to deal with crises (Khalily 2004; Khandker 1998; Mustafa et al. 1996a, b; Pitt and Khandker 1998). However, few of these studies compare results with those not members of microfinance programs.

Microfinance has become an 'inducer' in many community development activities, and it is an ingredient in many larger programs, such as education and training, employment generation, empowerment of women, social responsiveness, and political awareness (ADB 2000; Alamgir 1997; Jahan 1991). It also promotes the growth of local enterprises and women entrepreneurs (Bertaux and Crable 2007; Morduch 1999; Pitt and Khandker 1998). Theoretically, these successes rely heavily on the conception that borrowers can make use of their social capital to overcome many problems associated with asymmetric information in credit markets, such as adverse selection, moral hazard, collateral and contract enforcement (Gomez and Santor 2001). Hossain's (2002, p. 159) study in Bangladesh reveals the importance of various factors behind the improvement in economic condition and, thus, improvement in material condition and poverty alleviation among microfinance borrowers. In this study, about 60 % of borrowers believe that capital gained from a microfinance program primarily assisted them in achieving a better socioeconomic condition.

Grameen Bank's (the pioneer of microfinance in Bangladesh) experiments and its success have led to wider acceptability of the notion that accesses to credit by the poor can bring about change in their socioeconomic situation (Khalily 2004; Simanowitz 2003). Hossain's (2002, p. 159) evidence shows that membership in a microfinance program has a positive impact on borrowers' perceptions of their income status.

Most studies on the impact of microfinance programs focus on poverty as measured by income alone (Alamgir 2000; Gomez and Santor 2001; Hietalahti and Linden 2006; Mosley and Hulme 1998; Shaw 2004), with a few studies examining two or more aspects of poverty concurrently (Berger 1989; Johnson 2005;

Khandker 1998; Rahman 2002; Zohir et al. 2001). In the context of the above discussion, the hypotheses tested in this study are as follows:

- H1:** *Individuals involved in a microfinance program exhibit increased income as compared to those not involved.*
- H2:** *Individuals involved in a microfinance program for longer rather than shorter durations exhibit increased household wealth.*

A major contribution of this paper is that it focuses on economic income and physical assets for MFI members as compared to non-members. As such, this study examines the issues from a wider perspective than most previous studies by looking beyond income parameters. The next section discusses the research design and data-gathering procedures used in the study.

## 2.4 Research Design and Sample Selection

The study gathered data from MFI members who had been in a microfinance program for at least two durations—4 and 8 years. The third group of respondents consisted of the control group<sup>1</sup> made up of people who are not members of any microfinance program. Two structured interview guides for MFI members and non-members were used. In the questions for MFI members, responses provide data for two different time segments, first, for the ‘present’ status of members and, second, for their status ‘before they became a member of the MFI.’ Copies of the structured interview guides were evaluated and critiqued by a microfinance expert in UNDP, a senior academic in development studies from the University of Melbourne and executives from the Grameen Bank and BRAC in Bangladesh.

Bangladesh was chosen as the geographical area for this research due to the success of microfinance in this country in improving the socioeconomic status of the vast majority of poor people (Bhatt and Tang 2001; Hashemi 1996; Holcombe 1995; Khandker 1998; Pitt and Khandker 1998). For the purpose of this study, the top 50 MFIs according to the Credit and Development Forum (CDF 2004) ranking were selected. After a series of communications with potential respondents, a successful negotiation was made with the Association for Social Advancement (ASA). In selecting specific locations for interviews, random sampling was used and three (Gaibandha, Gazipur, and Kurigram) of 64 districts were selected. All names of prospective participants provided were for female members, since members of the ASA are primarily women (99.99 %) (Chowdhury 2005).

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<sup>1</sup> A second approach is the control group method which has been widely used. This requires a *before and after* comparison of a population that received a specific treatment (that is, a microfinance program) and an identical population (or as close as possible) that did not receive the treatment (Hulme 2000). This study uses a control group approach.

In the first stage, a sample was selected from the three chosen districts according to two categories: those with 4-year MFI membership (Group 1) and those with 8-year MFI membership (Group 2). Then, a random sampling technique was used to select 33 MFI members from each group. In this way, a total of 198 MFI members were selected for the interview process from the three districts (that is, 3 districts  $\times$  2 groups  $\times$  33 MFI members). It was also agreed with the participating MFIs that if a selected member did not wish to participate, details for a replacement MFI member would be provided.

In the second stage, we randomly approached one individual from each household, explained the project, and requested participation. Then, the potential participants were asked about their MFI membership status. People who had never been MFI members were interviewed (Group 3) until 99 agreed to participate, becoming the control group. Thus, 99 respondents from each of the three chosen districts (Groups 1, 2, and 3) participated to make up a total of 297 respondents.

The econometric tools used with the data to test the hypotheses include univariate tests of difference between the treatment and control groups, correlations and multivariate tests involving OLS regression.

## 2.5 Results: Microfinance and Poverty Alleviation

Income is the foremost determinant of the economic situation of individuals. Table 2.1 presents the monthly income earned by the interviewees divided into eleven ranges. The minimum income range is set as 500–999 taka and the maximum as 5,500 taka and above. The table provides percentages and the number of

**Table 2.1** Total amount of monthly income (taka)

Total amount of monthly income <sup>a</sup>	Non-MFI members	MFI members				
	Control group ( <i>N</i> = 99)	4 and 8 years ( <i>N</i> = 198)	4 years ( <i>N</i> = 99)		8 years ( <i>N</i> = 99)	
			Before	After	Before	After
500–2,999	58 % ( <i>n</i> = 57)	13 % ( <i>n</i> = 26)	76 % ( <i>n</i> = 75)	16 % ( <i>n</i> = 16)	59 % ( <i>n</i> = 60)	10 % ( <i>n</i> = 10)
3,000 and above	42 % ( <i>n</i> = 42)	87 % ( <i>n</i> = 172)	24 % ( <i>n</i> = 24)	84 % ( <i>n</i> = 83)	39 % ( <i>n</i> = 39)	90 % ( <i>n</i> = 89)
Ave. monthly income	2,586	4,326	2,131	4,116	2,552	4,535
<i>t</i> test	−9.704		−14.466		−16.269	
<i>p</i> value	0.000		0.000		0.000	
Effect of membership	<i>t</i> test		−1.662			
Duration on income	<i>p</i> value		0.098			

<sup>a</sup>Amounts in Bangladeshi taka (1 AUD = 56 taka at the time of interviews)

**Table 2.2** Number of income sources

Income source	Non-MFI members Control group ( $N = 99$ )	MFI members		
		4 and 8 years ( $N = 198$ )	4 years ( $N = 99$ )	8 years ( $N = 99$ )
Number 1	100 % ( $n = 99$ )	100 % ( $n = 198$ )	100 % ( $n = 99$ )	100 % ( $n = 99$ )
Number 2	24 % ( $n = 24$ )	79 % ( $n = 156$ )	86 % ( $n = 85$ )	72 % ( $n = 71$ )
Pearson's chi-squared test	82.246		5.923	
$p$ value	0.000		0.015	
Number 3	2 % ( $n = 2$ )	23 % ( $n = 46$ )	22 % ( $n = 22$ )	24 % ( $n = 24$ )
Pearson's chi-squared test	21.917		0.113	
$p$ value	0.000		0.736	
Number 4	0	3 % ( $n = 5$ )	3 % ( $n = 3$ )	2 % ( $n = 2$ )
Pearson's chi-squared test	2.543		0.205	
$p$ value	0.111		0.652	

respondents in each income range. On average, MFI members earn 4,326 taka, 1.7 times more than 'control' group members (2,586 taka). MFI members achieve significantly higher income than control group respondents ( $t = -9.704$ ,  $p < 0.01$ ).

Moreover, MFI members from both groups (4 and 8 year) achieve a significant improvement after joining the program. Table 2.2 shows the average income of both the groups almost doubled over the membership period, increasing from 2,131 to 4,116 taka for the '4-year' group, and from 2,551 to 4,535 taka for the '8-year' group. If 2,500–2,999 taka is taken as a reference point, 58 % of the control group members have income within this low range, whereas this is so for only 13 % of MFI members (16 % of '4-year' and 10 % of '8-year' groups). T tests reveal a significant difference ( $-14.466$ ,  $p < 0.01$ ) between the 'before' and 'after' membership period. Income is also significantly ( $-16.269$ ,  $p < 0.01$ ) different in the 'before' and 'after' 8 years of membership. No association is found between membership duration and total monthly income.

Table 2.2 reveals that 79 % of MFI members have a second source of income as compared to only 24 % of the control group respondents. This difference is significant ( $\text{Chi}^2 = 82.246$ ,  $p < 0.01$ ). Moreover, 23 % of MFI members report having a third income source as compared to 2 % of the control group. This difference is also significant ( $\text{Chi}^2 = 21.917$ ,  $p < 0.01$ ). Lastly, although 3 % of MFI members have a fourth income source, none of the control group members does, but this difference is not statistically significant. Of the members from the 4-year group, 86 % have a second source of income as compared to 71 % of respondents from the 8-year group and this difference is also significant ( $\text{Chi}^2 = 5.923$ ,  $p < 0.05$ ). As the general nature of poverty in rural Bangladesh is chronic and seasonal, having multiple sources of income can better equip the rural poor to fight poverty. Thus, Tables 2.2 and 2.3 show that MFI members have an economic advantage over the control group respondents.

**Table 2.3** Total amount of monthly expenditure

Total amount of monthly expenditure <sup>a</sup>	Non-MFI members	MFI members				
		4 and 8 years (N = 198)	4 years (N = 99)		8 years (N = 99)	
			Before	After	Before	After
500–999	7 % (n = 7)	0	3 % (n = 3)	0	2 % (n = 2)	0
1,000–1,499	15 % (n = 15)	1 % (n = 1)	15 % (n = 15)	0	8 % (n = 8)	1 % (n = 1)
1,500–1,999	14 % (n = 14)	6 % (n = 12)	19 % (n = 19)	9 % (n = 9)	19 % (n = 19)	3 % (n = 3)
2,000–2,499	18 % (n = 18)	7 % (n = 13)	24 % (n = 24)	6 % (n = 6)	18 % (n = 18)	7 % (n = 7)
2,500–2,999	12 % (n = 12)	10 % (n = 20)	9 % (n = 9)	17 % (n = 17)	9 % (n = 9)	3 % (n = 3)
3,000–3,499	10 % (n = 10)	18 % (n = 36)	15 % (n = 15)	19 % (n = 19)	21 % (n = 21)	17 % (n = 17)
3,500–3,999	4 % (n = 4)	9 % (n = 18)	3 % (n = 3)	7 % (n = 7)	2 % (n = 2)	11 % (n = 11)
4,000–4,499	10 % (n = 10)	15 % (n = 29)	6 % (n = 6)	16 % (n = 16)	10 % (n = 10)	13 % (n = 13)
4,500–4,999	0	7 % (n = 14)	0	5 % (n = 5)	1 % (n = 1)	9 % (n = 9)
5,000–5,499	5 % (n = 5)	12 % (n = 24)	2 % (n = 2)	8 % (n = 8)	8 % (n = 8)	16 % (n = 16)
5,500 and above	4 % (n = 4)	16 % (n = 31)	3 % (n = 3)	12 % (n = 12)	1 % (n = 1)	19 % (n = 19)
Average monthly expenditure (taka)	2,389	3,715	2,237	3,455	2,586	3,975
<i>t</i> test <i>p</i> value	–8.000 0.000		–13.860 0.000	↓	–15.321 0.000	↓
Effect of membership duration on monthly expenditure		<i>t</i> test <i>p</i> value	–1.672 0.096			

<sup>a</sup>Amounts in Bangladeshi taka (1 AUD = 56 taka at the time of the interviews)

Expenditure determines one's capacity to acquire necessities and, more specifically, for respondents to meet their basic needs and live a decent life. Table 2.4 shows that MFI members spend more each month compared to control group respondents. For example, in the highest expenditure category (5,500 taka and above), 16 % of MFI members are recorded as compared to only 4 % of control group respondents. Likewise, in the same expenditure category, MFI members from both the 4- and 8-year groups spend more after joining the microfinance program than before. It can also be inferred that after joining an MFI, members'

**Table 2.4** Total amount of household savings

Total amount of savings <sup>a</sup>	Non-MFI members	MFI Members		
	Control group ( <i>N</i> = 99)	4 and 8 years ( <i>N</i> = 198)	4 years ( <i>N</i> = 99)	8 years ( <i>N</i> = 99)
No savings	70 % ( <i>n</i> = 69)	–	–	–
1–999	12 % ( <i>n</i> = 12)	13 % ( <i>n</i> = 25)	14 % ( <i>n</i> = 14)	11 % ( <i>n</i> = 11)
1,000–1,999	6 % ( <i>n</i> = 6)	30 % ( <i>n</i> = 59)	34 % ( <i>n</i> = 34)	25 % ( <i>n</i> = 25)
2,000–2,999	3 % ( <i>n</i> = 3)	20 % ( <i>n</i> = 40)	20 % ( <i>n</i> = 20)	20 % ( <i>n</i> = 20)
3,000–3,999	1 % ( <i>n</i> = 1)	6 % ( <i>n</i> = 12)	6 % ( <i>n</i> = 6)	6 % ( <i>n</i> = 6)
4,000–4,999	–	3 % ( <i>n</i> = 6)	2 % ( <i>n</i> = 2)	4 % ( <i>n</i> = 4)
5,000–5,999	1 % ( <i>n</i> = 1)	9 % ( <i>n</i> = 18)	11 % ( <i>n</i> = 11)	7 % ( <i>n</i> = 7)
6,000–6,999	–	2 % ( <i>n</i> = 3)	–	3 % ( <i>n</i> = 3)
7,000–7,999	–	2 % ( <i>n</i> = 3)	1 % ( <i>n</i> = 1)	2 % ( <i>n</i> = 2)
8,000–8,999	–	1 % ( <i>n</i> = 2)	–	2 % ( <i>n</i> = 2)
9,000–9,999	–	–	–	–
10,000–10,999	2 % ( <i>n</i> = 2)	4 % ( <i>n</i> = 9)	4 % ( <i>n</i> = 4)	5 % ( <i>n</i> = 5)
11,000 and above	5 % ( <i>n</i> = 5)	11 % ( <i>n</i> = 21)	7 % ( <i>n</i> = 7)	14 % ( <i>n</i> = 14)
Average savings (taka)	960	3359	2818	3899
<i>t</i> test	–7.791		–2.170	
<i>p</i> value	0.000		0.031	

<sup>a</sup>Amounts in Bangladeshi taka (1 AUD = 56 taka at the time of the interviews)

income increases (revealed in Table 2.2) and this makes it possible for them to spend more. It is also apparent that, on average, the monthly expenditure of MFI members (3,715 taka) is 1.6 times more than that of the ‘control’ group (2,389 taka). This difference is significant ( $t = -8.000$ ,  $p < 0.01$ ).

Table 2.3 reveals that the average monthly expenditure of the ‘4-year’ group increased from 2,237 taka before joining to 3,455 taka after, while the ‘8-year’ group reported an increase from 2,586 taka before to 3,975 taka after. If 2,500–2,999 taka is taken as a reference point, the monthly expenditure of 67 % of respondents from the control group falls within this low range, whereas this is the case for only 23 % of MFI members (32 % of the ‘4-year’ group and 14 % of the ‘8-year’ group fall in the same low range). T tests for monthly expenditure between ‘before’ and ‘after’ joining, in both the ‘4-year’ and ‘8-year’ groups, are significant ( $t = -13.860$ ,  $p < 0.01$  and  $t = -15.321$ ,  $p < 0.01$ , respectively). However, there is no significant difference ( $t = -1.672$ ,  $p > 0.05$ ) between membership duration and monthly expenditure.

Savings are an important asset that provides financial security in response to shocks. Compulsory savings schemes are practiced by most MFIs, including ASA. Table 2.4 shows savings reported by participants, divided into twelve ranges. The minimum savings range is set as 1–999 taka and the maximum 11,000 taka and above.



Table 2.4 shows that MFI members achieve higher savings than control group respondents, as 70 % of respondents from the control group have no savings as compared to MFI members, each of whom has at least some savings. It is also revealed that, on average, respondents from the '8-year' group have the highest savings (3,899 taka), followed by the '4-year' (2,818 taka) and control groups with an average of 960 taka. This is a significant difference ( $t = -7.791$ ,  $p < 0.01$ ). Savings is also significantly different ( $t = 2.170$ ,  $p < 0.05$ ) between the 4- and 8-year MFI member groups. Interestingly, in the highest range (11,000 taka and above), the '8-year' group numbers are almost double the '4-year' group. Membership duration does appear to have a significant impact on the level of savings achieved by MFI members, but whether this is because of compulsory savings cannot be discerned.

Table 2.5 shows the Pearson's correlations between MFI members' total loans and their total monthly income, expenditure, and household savings. There are significant positive correlations between loan amounts and other indicators of poverty. The Pearson's  $r$  between loans and income is 0.482; it is 0.352 between loans and expenditure; and 0.359 between loans and savings. Not unexpectedly, the highest correlation is between income and expenditure at 0.778.

Housing arrangements are an important determinant of economic status. Table 2.6 shows housing arrangements for all respondents.

The data reveal that 97 % of MFI members own the property they live in as compared to 36 % of control group respondents, a difference which is significant ( $\text{Chi}^2 = 135.927$ ,  $p < 0.01$ ). However, house ownership for 4- and 8-year MFI members is not significantly different. Nineteen percentage of control group respondents rent their houses. Conversely, no MFI members rent their houses after joining the program and this difference is also significant ( $\text{Chi}^2 = 40.597$ ,  $p < 0.01$ ). Table 2.6 shows that 23 % of control group respondents live on land which they do not own or rent, but use for free, compared to only 2 % of MFI members, a difference which is significant ( $\text{Chi}^2 = 35.933$ ,  $p < 0.01$ ). Likewise, a higher percentage (21 %) of control group members live in squatters compared to only 1 % of MFI members, a difference which is significant ( $\text{Chi}^2 = 37.702$ ,  $p < 0.01$ ).

Table 2.7 reveals materials used in the construction of respondents' houses.

MFI member and non-member respondents report similar flooring materials. However, an improvement in flooring materials is recorded after MFI membership compared to before for both the 4- and 8-year groups ( $\text{Chi}^2 = 75.326$ ,  $p < 0.01$ ;

**Table 2.5** Pearson's correlations: member's total loans, income, and expenditure

Variable name	Total household savings after membership	Monthly household expenditure	Total monthly income
Monthly household expenditure	0.254(**)		
Total monthly income	0.380(**)	0.778(**)	
Total amount of loans received	0.359(**)	0.352(**)	0.482(**)

\*\*Correlation is significant at the 0.01 level (2-tailed)

**Table 2.6** Respondents' housing arrangements

Housing	Non-MFI members	MFI members				
	Control group ( <i>N</i> = 99)	4 and 8 years ( <i>N</i> = 198)	4 years ( <i>N</i> = 99)		8 years ( <i>N</i> = 99)	
			Before	After	Before	After
Owned	36 % ( <i>n</i> = 36)	97 % ( <i>n</i> = 192)	94 % ( <i>n</i> = 93)	97 % ( <i>n</i> = 96)	95 % ( <i>n</i> = 94)	97 % ( <i>n</i> = 96)
Pearson's chi-squared test <i>p</i> value	135.927 0.000					
<i>t</i> test <i>p</i> value			0.175 0.083		−1.421 0.158	
Rent	19 % ( <i>n</i> = 19)	0	1 % ( <i>n</i> = 1)	0	0	0
Pearson's chi-squared test <i>p</i> value	40.597 0.000		N/A		N/A	
Given as free use	23 % ( <i>n</i> = 23)	2 % ( <i>n</i> = 4)	4 % ( <i>n</i> = 4)	2 % ( <i>n</i> = 2)	4 % ( <i>n</i> = 4)	2 % ( <i>n</i> = 2)
Pearson's chi-squared test <i>p</i> value	35.933 0.000		N/A		N/A	
Squatters	21 % ( <i>n</i> = 21)	1 % ( <i>n</i> = 2)	1 % ( <i>n</i> = 1)	1 % ( <i>n</i> = 1)	1 % ( <i>n</i> = 1)	1 % ( <i>n</i> = 1)
Pearson's chi-squared test <i>p</i> value	37.702 0.000		N/A		N/A	

$\chi^2 = 25.402$ ,  $p < 0.01$ ). However, there is no significant difference in the type of flooring material used by people with different durations of MFI membership. Of the roofing materials listed in Table 2.9, 'straw' is the most vulnerable and unstable, while tin and brick (concrete) are more stable. The vulnerability of housing materials used is closely linked to economic situation, and investigating this issue in the context of Bangladesh helps evaluate the relationship between MFI membership and housing quality.

Table 2.7 shows that roofing type is significantly different between MFI members and non-members, with the difference being significant ( $\chi^2 = 9.670$ ,  $p < 0.01$ ). After joining the microfinance program, more than 27 % of respondents from both the 4- and 8-year groups were able to improve the condition of their roofs and avoid using straw. An additional 23 % in the '4-year' group and 24 % in the '8-year' group use tin in the 'after' category compared to 'before.' This is a significant difference for the '4-year' ( $\chi^2 = 24.057$ ,  $p < 0.01$ ) and '8-year' ( $\chi^2 = 23.689$ ,  $p < 0.01$ ) groups. However, there is no significant difference found for the duration of membership.

**Table 2.7** House construction

Materials		Non-MFI members	MFI members				
		Control group ( <i>N</i> = 99)	4 and 8 years ( <i>N</i> = 198)	4 years ( <i>N</i> = 99)		8 years ( <i>N</i> = 99)	
				Before	After	Before	After
Floor	Brick	10 % ( <i>n</i> = 10)	13 % ( <i>n</i> = 26)	7 % ( <i>n</i> = 7)	9 % ( <i>n</i> = 9)	5 % ( <i>n</i> = 5)	17 % ( <i>n</i> = 17)
	Mud	90 % ( <i>n</i> = 89)	87 % ( <i>n</i> = 172)	93 % ( <i>n</i> = 92)	91 % ( <i>n</i> = 90)	95 % ( <i>n</i> = 94)	83 % ( <i>n</i> = 82)
Pearson's chi-squared test <i>p</i> value		0.569 0.451		75.326 0.000	↓	25.402 0.000	↓
Effect of membership duration on floor material			Chi-squared value <i>p</i> value	2.834 0.092			
Roof	Brick	2 % ( <i>n</i> = 2)	5 % ( <i>n</i> = 10)	1 % ( <i>n</i> = 1)	5 % ( <i>n</i> = 5)	1 % ( <i>n</i> = 1)	5 % ( <i>n</i> = 5)
	Tin	84 % ( <i>n</i> = 83)	90 % ( <i>n</i> = 179)	65 % ( <i>n</i> = 64)	88 % ( <i>n</i> = 87)	69 % ( <i>n</i> = 68)	93 % ( <i>n</i> = 92)
	Straw	14 % ( <i>n</i> = 14)	5 % ( <i>n</i> = 9)	34 % ( <i>n</i> = 34)	7 % ( <i>n</i> = 7)	30 % ( <i>n</i> = 30)	2 % ( <i>n</i> = 2)
Pearson's chi-squared test <i>p</i> value		9.670 0.008		24.057 0.000	↓	23.689 0.000	↓
Effect of membership duration on roof material			Chi-squared value <i>p</i> value	2.917 0.233			
Walls	Brick	5 % ( <i>n</i> = 5)	14 % ( <i>n</i> = 27)	6 % ( <i>n</i> = 6)	13 % ( <i>n</i> = 13)	3 % ( <i>n</i> = 3)	14 % ( <i>n</i> = 14)
	Tin	43 % ( <i>n</i> = 43)	68 % ( <i>n</i> = 134)	36 % ( <i>n</i> = 36)	67 % ( <i>n</i> = 66)	42 % ( <i>n</i> = 42)	69 % ( <i>n</i> = 68)
	Straw	46 % ( <i>n</i> = 46)	6 % ( <i>n</i> = 12)	39 % ( <i>n</i> = 39)	7 % ( <i>n</i> = 7)	34 % ( <i>n</i> = 34)	5 % ( <i>n</i> = 5)
	Mud	5 % ( <i>n</i> = 5)	13 % ( <i>n</i> = 25)	18 % ( <i>n</i> = 18)	13 % ( <i>n</i> = 13)	20 % ( <i>n</i> = 20)	12 % ( <i>n</i> = 12)
Pearson's chi-squared test <i>p</i> value		69.947 0.000		120.317 0.000	↓	74.263 0.000	↓
Effect of membership duration on wall material			Chi-squared value <i>p</i> value	0.440 0.932			

The last section of Table 2.7 indicates the materials used by respondents in the walls of their houses. Compared to the control group, a greater proportion of MFI members use superior, more durable materials. The major differences are recorded between using straw and tin. Only 6 % of MFI members use straw as compared to 46 % of respondents from the control group. Of MFI members,

68 % use tin as compared to 43 % of the control group. This difference is significant ( $\text{Chi}^2 = 69.947$ ,  $p < 0.01$ ). Moreover, improvement in wall condition is recorded after MFI membership begins in both the 4- and 8-year groups. The 'before' and 'after' joining for the '4-year' group is significantly different in terms of wall material ( $\text{Chi}^2 = 120.317$ ,  $p < 0.01$ ) and similarly for the '8-year' group ( $\text{Chi}^2 = 74.263$ ,  $p < 0.01$ ). However, there is no significant difference between MFI membership duration groups.

Ownership of land is an important determinant of economic situation and is valuable in providing financial security as well as a source of earnings. Table 2.8 shows

**Table 2.8** Respondents' land ownership

Land owned (area in acres)	Non-MFI members	MFI members				
		4 and 8 years ( $N = 198$ )	4 years ( $N = 99$ )		8 years ( $N = 99$ )	
			Before	After	Before	After
No land	83 % ( $n = 82$ )	48 % ( $n = 96$ )	73 % ( $n = 72$ )	54 % ( $n = 53$ )	62 % ( $n = 61$ )	43 % ( $n = 43$ )
0.01–0.25	2 % ( $n = 2$ )	12 % ( $n = 23$ )	7 % ( $n = 7$ )	12 % ( $n = 12$ )	10 % ( $n = 10$ )	11 % ( $n = 11$ )
0.26–0.5	3 % ( $n = 3$ )	14 % ( $n = 28$ )	3 % ( $n = 3$ )	11 % ( $n = 11$ )	10 % ( $n = 10$ )	17 % ( $n = 17$ )
0.51–0.75	4 % ( $n = 4$ )	8 % ( $n = 16$ )	8 % ( $n = 8$ )	6 % ( $n = 6$ )	7 % ( $n = 7$ )	10 % ( $n = 10$ )
0.76–1.0	1 % ( $n = 1$ )	5 % ( $n = 10$ )	1 % ( $n = 1$ )	3 % ( $n = 3$ )	3 % ( $n = 3$ )	7 % ( $n = 7$ )
1.01–1.25	0	1 % ( $n = 1$ )	0	1 % ( $n = 1$ )	0	0
1.26–1.50	4 % ( $n = 4$ )	5 % ( $n = 9$ )	4 % ( $n = 4$ )	5 % ( $n = 5$ )	3 % ( $n = 3$ )	4 % ( $n = 4$ )
1.51–1.75	0	2 % ( $n = 4$ )	1 % ( $n = 1$ )	4 % ( $n = 4$ )	1 % ( $n = 1$ )	0
1.76–2.0	0	2 % ( $n = 4$ )	2 % ( $n = 2$ )	1 % ( $n = 1$ )	2 % ( $n = 2$ )	3 % ( $n = 3$ )
2.01–2.25	0	0	0	0	0	0
2.26–2.50	0	3 % ( $n = 6$ )	1 % ( $n = 1$ )	3 % ( $n = 3$ )	1 % ( $n = 1$ )	3 % ( $n = 3$ )
2.51 and above	3 % ( $n = 3$ )	1 % ( $n = 1$ )	0	0	1 % ( $n = 1$ )	1 % ( $n = 1$ )
Average area owned	0.16	0.33	0.18	0.31	0.22	0.35
<i>t</i> test	–3.358		6.449	↓	7.404	↓
<i>p</i> value	0.001		0.000		0.000	
Effect of member- ship duration on land ownership		<i>t</i> test	–0.820			
		<i>p</i> value	0.413			

that 17 % of control group respondents own land compared to 52 % of MFI members. Three percentage of control group respondents own 2.51 acres of land or above as compared to only 1 % of MFI members. The table shows that, on average, MFI members own double the land area compared to control group respondents (0.33 acres compared with 0.16 acres), a difference that is significant ( $t$  test =  $-3.358$ ,  $p < 0.01$ ).

MFI members in both 4- and 8-year groups acquired more land after they joined the microfinance program. The average land area owned by both groups increased (from 0.18 to 0.31 acres and 0.22 to 0.35 acres, respectively). These differences are significant ( $t$  test =  $6.449$ ,  $p < 0.01$  and  $t$  test =  $7.404$ ,  $p < 0.01$ ). However, there is no significant difference between membership duration and land area owned by MFI members.

Table 2.9 arguably captures the very nature of poverty and its effects on human beings. It reveals the frequency of daily food intake reported by the respondents. The table shows that 39 % of control group respondents have three meals per day compared to 96 % of MFI members. On average, control group respondents have 2.38 meals per day or just over 7 meals every three days, whereas MFI members have less than three (2.95) meals daily. This difference is significant ( $\text{Chi}^2 = 121.111$ ,  $p < 0.01$ ). The table also shows a significant improvement in food intake by the 4- and 8-year groups after joining the microfinance program ( $\text{Chi}^2 = 25.918$ ,  $p < 0.01$  and  $\text{Chi}^2 = 46.867$ ,  $p < 0.01$ , respectively). However, there is no significant relationship between duration of MFI membership and frequency of daily food intake.

**Table 2.9** Respondents' daily food intake

Meals per day	Non-MFI members	MFI members				
		4 and 8 years ( $N = 198$ )	4 years ( $N = 99$ )		8 years ( $N = 99$ )	
			Before	After	Before	After
Once	1 % ( $n = 1$ )	1 % ( $n = 1$ )	5 % ( $n = 5$ )	0	10 % ( $n = 10$ )	1 % ( $n = 1$ )
Twice	60 % ( $n = 59$ )	4 % ( $n = 7$ )	47 % ( $n = 47$ )	3 % ( $n = 3$ )	36 % ( $n = 36$ )	4 % ( $n = 4$ )
Three times	39 % ( $n = 39$ )	96 % ( $n = 190$ )	47 % ( $n = 47$ )	97 % ( $n = 96$ )	54 % ( $n = 53$ )	95 % ( $n = 94$ )
Average meals/day	2.38	2.95	2.42	2.97	2.43	2.94
Pearson's chi-squared test $p$ value	121.111 0.000		25.918 0.000	↓	46.867 0.000	↓
Effect of membership duration on daily food intake		Chi-squared value $p$ value	2.148 0.542			

Overall, these findings support the hypothesis of association between MFI membership and poverty alleviation. Table 2.9 shows that MFI members are far better off than non-MFI members in terms of their frequency of daily food intake.

### 2.5.1 Linear Regression Model 1

Table 2.10 presents a linear regression model with the difference in monthly income after joining the MFI compared to that before joining the MFI

**Table 2.10** OLS linear regression model on ‘income difference’ ( $N = 297$ )

Dependent variable = ‘current income’	Standardized coefficients		$t$	Sig.
	Beta	Std. error		
(Constant)	0.066	794.155	−1.281	0.201
Household size	0.520	63.588	1.478	0.140
MFI Membership	0.120	295.878	8.066	<b>0.000</b>
Mainhhincome	0.108	18.908	2.620	<b>0.009</b>
LandBalance	0.207	332.104	2.433	<b>0.016</b>
MobileBalance	0.068	377.233	4.466	<b>0.000</b>
RadioBalance	−0.062	246.696	1.425	0.155
Kurigram	−0.041	207.557	−1.368	0.172
foodprobD1	−0.020	30.792	−0.919	0.359
foodprobD2	−0.014	75.104	−0.424	0.672
houseOwnedYN	0.012	315.204	−0.231	0.817
Roof after	0.082	296.791	0.250	0.803
Floor after	0.029	341.416	1.598	0.111
Wall after	0.066	144.286	0.549	0.584
Average VIF	1.35			
$F$ statistic	20.221			
$p$ value	0.000			
Adjusted $R^2$	45.8 %			

#### Legend

*Household size* Household size (number of people within respondent’s household)

*MFI Membership* Membership of a MFI (1 if respondent is a member, 0 = otherwise)

*Mainhhincome* Main source of household income (1 if agricultural, 0 otherwise)

*LandBalance* Ownership of land (in area) by respondent household

*MobileBalance* Ownership of mobile phone(s) by respondent household

*RadioBalance* Ownership of radio by the respondent household

*Kurigram* Program area (1 if respondent is a resident in relevant area, 0 otherwise)

*foodprobD1* Duration in months of first annual incidence of difficulty in accessing food

*foodprobD2* Duration in months of second annual incidence of difficulty in accessing food

*houseOwnedYN* Status of housing arrangements (1 if respondent own the house, 0 otherwise)

*Roof after* Condition of roof of respondent’s house

*Floor after* Condition of floor of respondent’s house

*Wall after* Condition of wall of respondent’s house

(‘incomedifference’) as the dependent variable. For the control group, the income difference is the amount of their present income. This model analyzes the relationship between many of the indicators of asset possession and quality of life, as posited in the earlier section. The table presents the linear regression results from regressing various socioeconomic variables with difference of monthly income in different periods of time. In this analysis, the full sample that includes interviewees from all groups ( $N = 297$ ) is used.

The model has an adjusted  $R^2$  of 45.8 %, with an  $F$  statistic of 20.221 ( $p < 0.001$ ). The average variance inflation factor (VIF) of 1.35 shows that multicollinearity is not at a problematic level. As predicted, MFI membership is significant ( $p < 0.001$ ) and positively associated with the dependent variable (incomedifference), which represents the difference in monthly income after compared with ‘before’ for MFI members and the current income for non-members. Hence, H1 is supported. Other significant variables include main household income attributable to agriculture (Mainhhincom) ( $p < 0.01$ ), respondent’s ownership of land ( $p < 0.02$ ) and mobile phone(s) ( $p < 0.001$ ).

The household size; ownership of radio; the program area (Kurigram); difficulty in accessing food in duration 1 (probfoodD1) and duration 2 (probfoodD2); respondent’s status on house ownership (houseOwnedYN); and the quality of roof, floor, and wall of the house in which the respondent resides are not significant.

### 2.5.2 Linear Regression Model 2

Table 2.11 presents a linear regression model with square root of current savings by the respondents with ‘Sqrtsavings’ as the dependent variable. This variable represents the square root of the total amount of household savings. The variable is transformed so that regression assumptions are complied with more closely. This model analyzes the relationship between various socioeconomic variables that represent possession of assets and quality of life indicators as posited in the earlier section. However, this time the sample is restricted to only MFI members ( $n = 198$ ) and the hypothesis variable distinguishes between 4- and 8-year duration memberships.

In this case, savings is used as the dependent variable as it is impossible to expect respondents to correctly recall their actual monthly income 4 or 8 years prior to joining the MFI program. Besides, current savings is an effective measure of asset accumulation. The model has an adjusted  $R^2$  of 20.3 %, with an  $F$  statistic of 4.138 ( $p < 0.001$ ). The average VIF of 1.18 shows that multicollinearity is not at a problematic level. Table 2.11 shows that the hypothesis variable, membership duration, is significant ( $p < 0.05$ ) and, hence, there is a positive association with the dependent variable (‘Sqrtsaving’). Thus, longer rather than shorter MFI membership is associated with household wealth through the level of savings and H2 is supported.

**Table 2.11** Linear regression model on 'Sqrt savings' ( $N = 198$ )

Dependent variable = 'Sqrt saving'	Standardized coefficients		$t$	Sig.
	Beta	Std. error		
(Constant)		25.905	2.731	0.007
Kurigram	-0.062	6.604	-0.887	0.376
Memduration	0.132	5.910	2.007	<b>0.046</b>
Household size	-0.076	2.063	-1.136	0.257
Mainhhincome	0.146	0.548	2.161	<b>0.032</b>
Expensifees	-0.143	7.709	-2.117	<b>0.036</b>
Highestedu	-0.113	0.943	-1.560	0.120
Wall after	0.080	3.881	1.131	0.260
Roof after	-0.078	9.835	-1.147	0.253
Toiletathome	0.077	7.447	1.063	0.289
Fridgeownedafter	0.150	20.221	2.122	<b>0.035</b>
Mobileownedafter	0.160	10.285	2.179	<b>0.031</b>
Duckownedafter	0.087	3.444	1.300	0.195
Goatownedafter	0.082	2.420	1.231	0.220
Cowownedafter	0.076	2.040	1.113	0.267
foodprobD1	-0.116	1.440	-1.637	0.103
foodprobD2	-0.087	3.728	-1.225	0.222
Average VIF	1.18			
$F$ statistic	4.138			
$p$ value	0.000			
Adjusted $R^2$	20.3 %			

**Legend**

*Household size* Household size (number of people within the respondents' household)

*MFI Membership* Membership duration in MFI (1 = if respondent has been a member for 8 years, 0 = if respondent has been a member for 4 years)

*Household size* Household size (number of people within the respondents' household)

*Mainhhincome* Main source of household income (1 if agricultural, 0 otherwise)

*Expensifees* Reason for not consulting doctor in case of household sickness

*Highestedu* Respondent's highest educational attainment

*Wall after* Condition of wall of respondent's house

*Roof after* Condition of roof of respondent's house

*Toiletathome* Condition of toilet facility at respondent's home

*Fridgeownedafter* Ownership of fridge by the respondent's household

*Mobileownedafter* Ownership of mobile phone(s) by the respondent's household

*Duckownedafter* Ownership of duck by the respondent's household

*Goatownedafter* Ownership of goat(s) by the respondent's household

*Cowownedafter* Ownership of cow by the respondent's household

*Kurigram* Program area (1 if respondent is a resident in relevant area, 0 otherwise)

*foodprobD1* Duration in months of first annual incidence of difficulty in accessing food

*foodprobD2* Duration in months of second annual incidence of difficulty in accessing food



Among the other variables tested, as expected, the main source of household income being agricultural (Mainhhincome) is positively associated ( $p < 0.005$ ), while ownership of fridge (Fridgeownedafter) and mobile phone (Mobileownedafter) by the respondents is found positively significant ( $p < 0.005$ ). The expensiveness of medicines as a reason not to seek medical treatment (Expensifees) is negatively associated with 'Sqrtsavings' ( $p < 0.005$ ). The program area (Kurigram) in which the respondent resides, household size, highest educational attainment, construction materials used to build the wall and roof of the respondent's residence, status of toilet at home, ownership of livestock (duck, goat, and cow) and the durations of difficulty in accessing food (foodprobD1) and (foodprobD2) are not significant.

## 2.6 Conclusions, Limitations, and Further Research

Countries across the developing and developed world are increasingly supporting microfinance in playing an active role in development initiatives. This study analyzes this role, and its findings further support and rationalize the need for microfinance programs in both the developed and developing world. Overwhelmingly, the tests of difference in this study show that income and asset possession by MFI members is significantly higher than for the 'control' or non-member group. However, in testing for shorter versus longer MFI membership effects, no significant difference was revealed. Only household savings and the presence of a second income source were found to be linked to the duration of membership.

Overall, MFI members are revealed as economically better off than control group respondents in many aspects, including income, savings, housing arrangements and quality, assets owned, and frequency of food intake. These findings support those of other research undertaken in different countries, e.g., Thailand (Coleman 2006), Philippines (Habib et al. 2006), Bangladesh (Husain 1998), and Malawi (Zeller et al. 1998). Consistent with Khandker (1998), membership duration is found to be associated with household wealth. The public policy implications of these findings reinforce the value of microfinance programs as a means of poverty alleviation. The findings contribute to many studies that demonstrate the effectiveness of this form of financing of microenterprises as a tool to fight poverty.

There are at least three potential drawbacks of impact studies like this: 'possible selection bias,' 'endogeneity of program placement,' and 'fungibility of fund' (Coleman 2006; Hulme 2000; Khalily 2004). First, in terms of potential selection bias, individuals participating in microfinance programs have their own personal and family characteristics (Khalily 2004) and these factors also play a key role in determining program participation. Hulme (2000, p. 85) mentions five possible sources of 'selection bias': (a) difficulty in finding a location with the same socio-economic characteristics in both treatment and control groups; (b) difference in

'invisible' attributes (entrepreneurial drive and ability) among treatment and control groups; (c) any intervention that may result in a short-term positive response from the treatment group (Hawthorne effect); (d) the control group becoming contaminated by contact with the treatment group; and (e) 'fungibility' of the treatment group (e.g., credit is transferred or loans are misused).

A number of studies (Chen and Dunn 1996; Coleman 1999; Dunn and Arbuckle 2001; Hashemi et al. 1996; Mustafa et al. 1996b; Pitt and Khandker 1996) use a quasi-experimental design to estimate the effect of microfinance on participants. This study makes use of a control group to compare various aspects of the socioeconomic lives of MFI members with non-members. This approach helps minimize the effect of 'selection bias.'

Hulme (2000) also argues that careful selection of a control group that is far away from the treatment group can tackle the problem of location. But as Bangladesh is a densely populated country, with a microfinance operation in virtually every district, it was not possible to avoid the selection problem entirely and source control group respondents far from MFI members. However, the problem of contamination of the control group (d) can be addressed by an approach such as '*client-to-be*' (Hulme and Mosley 1996), a strategy this study adopted as the control group population had never been members of any MFI but had the potential to be clients of a MFI.

Second, in terms of the endogeneity of program placement, MFIs usually place their programs and branches in accessible areas with better infrastructural development (Khandker et al. 1995). Thus, the extent of the program impact also depends on program placement. However, Khalily (2004) suggests that this endogeneity has very little or no impact on those studies that identify socioeconomic, political, and environmental factors in assessing program impact at the household level. This study minimizes the 'endogeneity of program placement' by assessing the program's impact at the household level only.

Third, in terms of the issue of fungibility of credit, this is a critical problem in precisely determining the impact of credit (Adams et al. 1984; David and Meyer 1983; Pischke et al. 1983). This arises from an inability to distinguish the uses of microcredit and other funds between households and enterprises. No studies have successfully controlled for fungibility.

Overwhelmingly, evidence presented by this study is consistent with MFIs having made a substantial contribution to the overall improvement in the living standards and poverty situation of respondent MFI members as compared to control group members. But control for macroeconomic conditions or other exogenous variables such as market conditions and environmental conditions did not occur, and these are likely to affect microenterprise performance.

There are many areas for future research on exploring the linkages between MFIs and poverty alleviation: the impact of MFI membership on individuals over time, possible spillover effects arising from average neighborhood characteristics (using a larger sample size), other MFIs working in Bangladesh and comparing their impact on a larger scale, the experience of other countries and a cross-country comparison of MFIs' association with poverty alleviation.

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